

# **MASTERLINK CORPORATION**

## **1998 BUSINESS PLAN**

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# PROPRIETARY INFORMATION

## PRODUCTS

### MASTERLINK

MasterLink's Facilities Automation Simplification Technology (FAST) is a client/server application intended to manage the activities of skilled workers. The server contains all information regarding whatever needs to receive work (a machine), whoever will do the work (a person) and the rules (policies) governing their implementation and interactions. FAST can be deployed on a hand-held computer or PC workstation on a LAN, and provides the worker with all relevant task information residing on the server via a telecommunications link. The main components of this system are:

**Artificial Intelligence** - MasterLink automates supervision by using (artificially intelligent - AI) system agents to automate supervisory functions, which include work planning, scheduling and dispatching. **System Agents** are computer representations of people functions - they behave based on rules - which make them totally configurable in user-customized ways. This gives corporate management the ability to instantaneously respond to changing conditions, and maximize worker productivity with minimal human supervision. The various Systems Agents we will utilize are:

- **Planner Agent** - This agent inventories all items requiring work. It determines what tasks should be done, what skills are required and what material is needed. For example, it queries all equipment records to determine which ones are due for service. Its actions are controlled by policy in deciding if all criteria such as time, cycles, etc. have been met. When management has determined that criteria have been met, the agent will create a work order.
- **Scheduler Agent** - This agent matches the correct skill resource, verifies material availability and creates a proposed schedule. For example, it keeps track of the resources needed to accomplish the work orders created by the planner agent or other users. The rules governing this agent will deal with issues such as location, skills and time needed. Once this agent's evaluation is complete, the work order will be placed on a worker's schedule for completion.
- **Dispatcher Agent** - This agent is responsible for actually sending all of the task information to the assigned resource. This agent keeps track of the location and status of the workforce. When orders are added to a resource's schedule, the dispatcher will determine if the worker should be interrupted based upon priority rules or allowed to finish the current assignment. And, it knows what methods to use to contact the worker. It may decide to use a pager, for example, if the resource's handheld computer does not respond to messages.
- **Job Manager Agent** - This is the traffic cop for all other agents. When any system event occurs, internal or external, this agent evaluates rules determining which agent should respond. For example: The calendar changes from the 30th to the 1st, this agent may decide to wake up the planner agent to create new work orders for the new month.

Second generation agents will be more sophisticated than the first. MLC is working on designing policy agents that will be capable of changing the policies of other agents. In our initial system, new policies will not be created and adopted in the field. However, once a worker identifies a problem and its solution, and communicates these things to the central office, it can then be input into the system with minimum effort.

MasterLink's component-based intelligent agent architecture is designed to accommodate transition to, and utilization of, existing customer legacy (MIS) systems, which would allow the customer to preserve their investment in their current computer technology. Whenever possible, it will be fiscally responsible for MLC to buy whatever commercial off-the-shelf (COTS) AI codes that are suitable, and customize them for use in MasterLink.

**Definitions** - In order for these agents to work, they need a foundation on which to base their decisions. They need all the rules governing the organization's resources (internal & external) used to achieve a specific outcome. These rules are Policy. This (policy) foundation is our database, unique to MasterLink, which is a Superset Classification System that controls the behavior of the agents. It, along with the agent framework, is what makes our system work. Our database contains the following policy components:

- **Job Types** - This will define categories of tasks that can be performed in association with a type of job. It is a collection of tasks to be performed by a resource with the capacity to perform the tasks. For each job type there is a set of states that the system will manage;
- **Job State Transitions** - This will define the possible states that a job type may have, and the possible pathways from one state to another. Our agents will automate some of these transitions (to be performed by users of the system or external systems);
- **Tasks** - This will define the work to be executed on targets, and the requirements for performance of that work. It will include such attributes as skill requirements, parts or tool requirements, frequency of execution and other attributes;
- **Targets** - This will define the objects of work, and will be classified by a hierarchy that allows for the mass handling of associations between tasks and other targets. Classification hierarchies for targets will be pre-defined and usually associated with some standard. This pre-classifies most possible targets of work, and their component parts. The system uses this knowledge to aid in the generation of work to be applied to these kinds of targets;
- **Skills** - Part of defining tasks is to define what skills a resource must have to perform the task. The system uses this to aid in assignment of work;
- **Work Schedules** - Identifies to the system agents the availability of resources to the application of work on targets as relates to time for scheduling purposes;
- **Rules** - The rules by which the system agents will automate state transitions must be specified. Although an oversimplification, each system agent performs a set of functions associated with groups of job state transitions, e.g. assignment and scheduling of jobs. The rule sets are the control over the agents in performance of this work. Rule building will involve the identification of conditions which lead to resulting actions. The conditions and the resulting actions are defined in terms of system constructs (the user data are pre-defined as stated above). Rule definition may require minimal training for managers and/or supervisors, so that they can perform optimally.

These make our system easy to use and understand by all involved in the work process. MasterLink essentially reduces the complex world of work into three components: targets, resources and jobs. Targets are the objects of work. Resources are the things necessary for work to be executed (e.g., skilled workers, time and materials). Jobs are the collections of tasks to be applied to targets and are assigned to resources. Everything is defined and operates on the principle of these simple relationships, which anyone can understand. In addition, the MasterLink agent architecture provides each agent with a consistent set of application interfaces. These interfaces make it easy for our customers' information systems to use the agents as knowledge resources.

**Generic Utility** - MasterLink is also the first fully automated and simplified work process system with universal applicability to all work environs (very little customizing is required). The core software in our OO Frameworks will provide generic code that is 85% reusable in multiple work environments, and is intended to improve productivity wherever it is utilized. Any industry segment that is characterized by mobile work forces will find MasterLink an important addition to management/worker functionality.

In addition, many of the reusable aspects of MasterLink are composed of off-the-shelf data provided by the Construction Specification Institute (CSI). CSI has established standards that are universally accepted throughout the construction and facilities management industry. By agreement with CSI, we will incorporate their coding system into our database for use in these applications. As we move into other industries (not covered by CSI), we will develop our own databases that can be used across customer domains (thus maintaining the cost-effective generic attributes of MasterLink).

**System Configuration** - The initial platform to be developed and supported will be a Microsoft NT-based server utilizing a TCP/IP network. This will allow for control of hardware & administrative costs during the development process, provide excellent multi-tasking capabilities, and will be the easiest for our customers to integrate. Depending on customer feedback, the server-based components may subsequently be ported to other operating systems such as UNIX or MVS - our design has been developed to be portable and flexible to changing market conditions and technology. The central office client functions may be distributed in a LAN/WAN environment. The client servers we will use will be commercial off-the-shelf systems.

Mobile managers or other personnel will use laptops and network client connectivity software to perform remote functions. The range of options for mobile access will include Personal Data Assistant-type devices (PDAs) which will allow workers and managers to interface with the system. The leading contender at this point is the popular 3Com Palm III, which is adaptable across operating systems and platforms, and a ruggedized unit can be had for \$600/Unit (directly from 3Com - the manufacturer). We will charge approximately \$800 per Unit (including software). We will also offer laptops for certain applications, though for the purposes of this Plan, we'll stick with Palm Pilots and servers. It is conceivable that an entire implementation could be run by a single central office person, although this is not the expected approach (it will depend solely on the customer). The customer will have the system installed in one of two ways: they acquire the necessary hardware from MLC, with MasterLink pre-installed; or, they acquire the necessary hardware independently, and the software from MasterLink. These scenarios are dependent upon the development of the data Superset. We will already have the foundation, based on standardized market domain information, we then need to work with the customer to identify their policies and procedures and incorporate them into MasterLink.

In addition to the initial implementation, hardware and software costs involved in Direct and Subscription Sales, there will be ongoing product usage fees for server time, land lines, and (cellular) air time. These charges will be paid by the customer directly to the various communications providers. However, we will charge Subscription Sales customers a \$175/mo/Unit licensing fee for the MasterLink product.

## MASTERLINK: PROCESS IMPLEMENTATION

Businesses tend to follow the same process when implementing their policies and procedures (P&P) as they relate to their operations: 1) develop their P&P; 2) identify problems and plan to solve them; 3) schedule a time for the work to be completed; 4) get the right person to do the job; 5) get the job done; and, 6) make sure everybody knows the problem has been handled. Below is a more detailed synopsis of how potential customers are currently suffering through this process, and how incorporating MasterLink into their system architecture (whatever its status) will be of great benefit to their operations:

**System Initiation** - Currently, customers are forced to create their own numbering and/or coding systems in order to define basic facility information requirements (e.g., equipment grouping & relationships, skill definitions, task/time/skill requirements, etc.). This consumes enormous amounts of man/hours to develop and maintain (and it is very error-prone). Also, definitions become proprietary to the operator and depend upon their facility's operational philosophy. In addition, the methodology developed in-house may not be adaptable to future changes in philosophy or operational conditions.

MasterLink overcomes these problems by assuming that all facilities are operated according to existing  
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(pre-defined) standards that are conducive to being included in a Standardized Database Infrastructure. As previously mentioned, these CSI standards will be incorporated into MasterLink. This eliminates the need for CMMS users to create their own definitions. This is a critical factor in reducing the amount of time required for building operators to capture their particular facility in a CMMS, and it insures that all facilities are described in exactly the same way no matter where they are located, which is of tremendous help in creating direct comparisons between different locations. In addition, MasterLink goes beyond this basic standardization and classification process to include behaviors such as "lube motor" and "change filters", pre-defining all possible work needed to be accomplished. The MasterLink user can then determine the work to be done by making policy changes to achieve different outcomes.

This concept of defining work using existing definition tools is applicable to all industries. Some industries do not have formal standards that are recognized universally, but MLC believes there will be unrecognized standards to build upon. In which case, MLC may have to develop industry specific standards, leaving the systems' logic intact. Once these new Industry-Specific standards are established, MLC can then target other industry-related customers.

**Work Identification** - Typically, a company clerk generates a hardcopy work order (WO) and hand delivers it to the planner. The problem is that the clerk is unfamiliar with technical maintenance terms and is limited in accurately classifying the work to be performed. With MasterLink, the clerk would enter the WO into the computer network, where the workers can interface at their convenience, in their own vernacular. They can even also ask questions electronically, to further define their tasks and objectives.

**Work Planning** - Planners subjectively define job requirements which include: task definitions, required skills, needed materials and estimated completion time. Of course, this limits the quality of the planning to the quality of the planner. There is no verifiable method to determine if the optimal combination of resources is being used.

MasterLink will already have all the tasks, skills, materials and milestones entered into its (objective) database. That information will then be cross-referenced against actual performance history to select the best available personnel, and optimize skill utilization.

**Work Scheduling** - At this time, schedulers manually manage all backlogs (work orders in excess of immediate manpower) and try to distribute work evenly and as efficiently as they can. This makes it extremely difficult for the scheduler to react to continuously changing workloads. Using real-time information and proprietary algorithms, MasterLink automatically manages the backlog by evaluating items such as skill, time, location, policy, etc. to determine the optimal distribution of the manpower available.

Backlogs imply more work in the queue than can be completed with the time and resources available. Typically, decisions regarding which work to do versus which to delay is based on Job Priority. Such priorities are set by Policy and are controlled by the users. If higher priority jobs enter the queue after assignments have been delivered, then MasterLink will determine whether or not to alter an appropriate resource's schedule to reflect the higher priority work. MasterLink will determine if the work currently being executed by the workers should be interrupted, or if the new job should be inserted in the schedule after the open job. Jobs that enter the queue but which are not high enough priority to alter the work being performed in the field would remain in the queue until the next point in time where creation of work schedules would occur. This could be the next shift or the next day, or may be based upon a new resource being made available for assignment of work (such as if you bring on temporary or contract workers to address the backlog). Workers would become aware of changes in their work schedule via the handheld device, using a visible or audible alert. The worker would then acknowledge receipt of the update.

A major feature of the system is running scheduling in the planning mode by essentially running a continuous simulation (projection) analysis. For example, a manager can play with resource shift schedules, task skill requirements, etc. in order to get an idea of the capacity for work for some range of

time into the future. Pioneer Natural Resources uses simulation technology to create a model for scenario planning and "what-if" analyses, such as determining how much to pay a subcontractor for completing work ahead of schedule (and still allow PNR to earn a profit by bringing a well into production sooner than thought possible).<sup>1</sup> This can be done 24 hours a day, seven days a week, allowing adjustments to changing conditions on the fly, and providing superior resource management capabilities.

**Work Notification** - Once the scheduler receives the WO from the planner, he/she then personally distributes the hardcopy WO to the maintenance technician. However, they have to first *find* the technician. If they don't, one of two things will happen: the work doesn't get done until the technician is notified; or, the technician may discover the work need on his/her own, perform the work on their own initiative, and enter their work after-the-fact, which promotes incomplete data gathering, without readily available job descriptions, policies and procedures, the former scenario is most likely.

Using hand-held computers, the workers will immediately be made aware of any work orders issued. They will also receive work assignments from the system on a regularly scheduled basis as determined by policy. In addition, all job descriptions and P&P are available, allowing each worker to determine what amount of initiative (and risk) they may use in the performance of their task(s), who can assist them, and to whom they report their results. Also, all data regarding the work performed is entered, fostering complete data collection. Ultimately, we will use Diagramming and Advanced Graphics information to enable the scheduler (in a high-bandwidth network) to dispatch work requirements not only electronically, but also graphically. This will enhance understanding and the communications process. Workers are always provided with current data that is extremely easy to understand. In addition, by providing them with ready P&P, and a motivation to use more initiative, the mobile worker will be able to create a "field job" within the context of accessible work targets (the notification process will be reversed).

**Work Execution** - Currently, the worker arrives at the work site to complete the task. However, if any support documentation is needed, the worker then must return to base or ask for assistance. MasterLink rapidly identifies and specifies the "work" requirement within an environment and then provides the most efficient and effective solution. It presents workers with all the policies and procedures necessary to optimally complete tasks, in real time, tailored to the needs of the worker (e.g., electricians will only see electrical data).

The types of information delivered by MasterLink include the following: task instructions, safety procedures, training, historical data, situation assessment, material safety data, schematics and diagnostic advice. Worker productivity is improved by eliminating non-productive search efforts for support data and provides management with complete control over how and when work is to be performed. This eliminates costly non-value-added activities and allows the workforce to be fully utilized. By eliminating non-productive searches for support data, productivity is improved. MasterLink also monitors the enterprise and itself, vis-a-vis the work execution function. Agents then conform to any policy changes that control work execution behavior within the system.

In addition, MasterLink will serve to optimize personnel performance, by answering these five questions workers must know in order to perform their best: "Why are we here?"; "What is expected of me?"; "How am I doing?"; "What is in it for me?"; and, "Where do I go for help?". The company perceives the minimum default for frequency of interaction with the server to be twice per shift, both at the start and end. This would represent the perfectly managed resource because all of the scheduled work must have been planned ahead and not interrupted by unplanned events for this frequency of communication to be the most productive. The net result is the reduction in the time it takes to perform work at all levels of the organization, which optimizes productivity and increases profit.

**Work Closure** - Once the task is completed, the worker only returns the hardcopy WO to the clerk who records closure data on material, crew and time. The ONLY method that is used at this time is manual entry,

Activity	Hrs w/ Current Systems	Hrs w/ Master- Link®	Current Limitations	MasterLink Advantages
Produce a List of Things Requiring Work	0.0	0.0	Functionally the same	None
Produce Daily & Weekly Schedules for Individual Workers	40.0	2.0	Requires tedious manual calculations to distribute the workload amongst workers	Fully automated process that optimizes available resources by applying the right skill level based on a wide variety of factors
Dispatch Daily Work Orders	30.0	1.0	W.O. must be printed and sorted per individual worker; orders then sorted by day & worker, assigned a priority sequence, then manually distributed	All job schedule/task information delivered automatically to each worker's hand-held computer
Work Order Dispatch/Re-Assignment	10.0	0.0	Individual daily schedules reconfigured at end of each shift to account for uncompleted work and unplanned events that have altered schedules	Automatically reconstructed worker schedules; human intervention limited to handling exceptional situations
Work Order Execution	0.0	0.0	Worker arrives with minimal task information and no easily accessible job information	Workers provided with various kinds of data, including: historical, situation assessment, diagnostic advice, etc.; available through ATM-style interface
Work Order Closing	50.0	1.0	Data entry clerk manually enters work order labor & materials info; specific task info rarely entered due to sheer volume	Workers record all actions at point of work; time & materials recorded automatically; workers allowed to create new work orders in the field
<b>Totals</b>	<b>130.0</b>	<b>6.0</b>		

Table 2. MasterLink: Logistical Improvements

which often lacks details that would benefit additional work support and/or company operational data-keeping.

MasterLink automates field data reporting. MasterLink eliminates the need to manually re-key field data such as: date of work, job status, account charges, materials used, time expended, comments, defects observed, and tasks accomplished. The skilled worker, at the point of work, using a simple user interface device captures data. The mobile worker operates a machine that is simple and self-directed (no more complicated than a universally utilized ATM), which will be "ruggedized" as appropriate for the work

environment. Skilled workers will not require a lot of technical training to use the system. The result is consistent data reporting that is virtually error-free. Using the MasterLink system, the worker would press a function key ("Y" or "N") to electronically record all work done automatically, and a complete and accurate report becomes available - enhancing management productivity as well.

**Control** - Throughout this whole process, the people involved are relied upon to perform the job(s) he/she are dispatched to accomplish. A problem exists in verifying attendance, or even if the tasks have actually been completed. The MasterLink system helps ensure accountability by verifying attendance and prompting the worker to record all tasks done on the hand-held field unit. This system will eventually use a bar-code scanner, GPS technology, or a physical link through a serial port to place the worker at a specific location at a specific time. The hardware needed to confirm a worker has visited the work site is (currently) expensive, however, we anticipate that once our Release 1.0 is available, more cost-effective options will also become available.

In addition, MasterLink is designed to connect corporate management directly with its workforce. Its reporting capabilities are sharply focused on providing meaningful data upon which decisions may be based. Therefore, Central office personnel will be provided with interfaces for monitoring the status of the execution and management of work known to the system, including work being performed by systems agents. Users with appropriate privileges will be allowed to perform work management functions manually, as opposed to allowing the system to perform these functions. This is primarily used only on an exception basis where the user wants to override or change some action taken by the system such as a job assignment.

On the worker side, MasterLink provides the capability for him/her to record observations about targets of work as to their state and performance, or the source of an unplanned job being entered on the system. This includes entry through the worker platform of data describing targets of work as part of the initial data generation process for the system.

**Management Information** - By the time this whole process is completed, data may be a few days old, and of limited use. Then the report is written. In addition to not being current, information is typically unsophisticated and incomplete. MasterLink provides real-time data, which is comprehensive, complete and easy to understand.

The table on the previous page identifies how MasterLink will improve (save money in) the logistical process of handling work orders (assuming a 30 man crew w/3 supervisors & 1 data entry clerk). As can be seen, MasterLink offers tremendous labor (time) savings over current CMMS technology. In this example, the client observes a 95.4% reduction! The customer can therefore expect MasterLink to pay for itself in less than a year. Similar results are expected across market and industry boundaries.

## MASTERLINK: FEATURES & BENEFITS

MasterLink provides a whole new order of features and benefits that have heretofore been unknown in the world's CMMS markets:

- **Process (vs. Data) Centric** - CMMS software is characterized as *data centric*: cranking out reams of data to allow people to make informed decisions. MasterLink, on the other hand, not only keeps track of this data, it processes it by distilling out the irrelevant issues (using our intelligent agents), and focusing on the pertinent data. Simply put, if you define tasks and targets, you can do anything with policy;
- **Artificial Intelligence (Run Simulations)** - Because current systems are incapable of considering policy (or its implementation), it is impossible for management to understand the REAL effects of a policy decision. MasterLink allows management the ability to demonstrate the effectiveness of policy changes prior to implementation by enabling extensive "what if?"

capabilities. Managers can temporarily plug in changes in P&P (or S&P) and see what MasterLink indicates will be the anticipated results of such changes. This greatly increases management's ability to make sound P&P decisions that will positively affect the work process involved;

- **Standardized Database (Expedited Installation and Implementation, Lower Costs)** - Established (universal and corporate) standards and procedures (S&P) are included in our database. This saves each customer from having to develop their own such S&P, which can take many man/months to create. All installations (and training) should be completed in just three weeks, because not only is the software of universal utility, so is the hardware. Also, all decision-making is based upon pre-defined facility information (and work) requirements, thus eliminating the need to develop them on the fly, and expediting the work process;
- **User-Friendly** - Everything is defined and operates on simple relationships, that everyone understands. In addition, interaction of the field workers with the handheld device is minimal. They will not have to enter much data: all distribution of information gathered in the field would be automatic, controlled (automatically) by policy, and there will be no terms or codes to memorize. In future versions, a graphical interface will be used - workflow processes will be diagramed for all to instantly recognize their position (and importance) in getting the work completed;
- **Real-Time Communications (Manager in a Box)** - MasterLink is able to make decisions, based upon the data contained in its comprehensive database, to assist workers in the completion of their tasks. In addition, everyone involved in the work process is able to input their reports and inquiries directly into the network, so that all involved have access to real-time information regarding the tasks being performed. Also, MasterLink provides on-the-spot management assistance to everyone in the field. Workers' questions are answered immediately - policies, procedures and job requirements are instantly available;
- **Optimal Personnel Utilization (and Lower Personnel Requirements)** - MasterLink addresses the issue of "skill premiums", which is defined as the amount of excess skill delivered to accomplish a given set of tasks. For example: A class "A" electrician ("A" being the highest skill) being dispatched to do work that could be done by a class "C" electrician. This is being ignored wholesale by current CMMS technology. Our system tracks personnel enterprise-wide, identifying not only the skill premiums available, but where they are needed. With all personnel performance and job requirements data included in the database, our system automatically chooses those workers best suited (and available) for the work to be done. In addition, better utilization of personnel will increase individual work capacity and encourage redeployment of personnel to more productive tasks (or workforce downsizing). All these factors will result in improved supervisor-to-worker ratios, and, since MasterLink automates the data reporting process (eliminating manual data (paper) transfer as related to the facilities workflow process), there will be a corresponding reduction of data entry personnel;
- **Increased Management Efficiency (Performance Measuring, Improved Decision-Making)** - Currently, management must sift through voluminous amounts of data to make decisions, which is error-prone. This dramatically increases the amount of time it takes management to set policy. By having only (and ALL) the relevant information readily available, management only needs to consider the (pre-sifted) data presented, which saves time, and reduces error caused by incomplete data. Furthermore, a series of queries and reports will be available to provide the means for assessing and measuring the effects of

policies. Measurements will be provided on such categories as cost of work delivery, performance of targets, comparisons to objectives, inter-policy comparisons and resource utilization. This not only optimizes management's ability to prioritize improvements, it optimizes their ability to implement them. MasterLink also tracks the effectiveness of policy decisions manager by manager, so top management can evaluate all personnel in the company;

- **Improved Worker Productivity** - Having so much information so available to all involved in the work process optimizes work efforts and minimizes time delays. More work gets done in less time. In addition, these improvements, corrections and/or additions are automatically incorporated into the system for perpetual use. We expect at least a 30% increase in crew productivity, and are anxious to prove it in the real world; Also, with everyone in the loop, expectations are known and standardized throughout the enterprise, eliminating problems caused by misunderstandings and problematic assumptions made across departmental lines.
- **Enhanced Quality Management** - MasterLink scrutinizes the entire work process, allows management the ability to make policy decisions based upon outcomes, and then requires the entire system to implement each policy exactly the same way each time. This, in addition to providing the right information at the point of work to do the work right the first time, eliminates customer dissatisfaction and costly rework, and allows for timely delivery of products or services. It truly serves to provide for reaching the goal of zero defects;
- **Reliability** - MasterLink monitors and measures the results, using the customer's P&P, which enhances its capability to provide consistent decision-making outcomes. In addition, its measuring capability is able to discern different levels of (non)conformity, which allows for finer tuning of the decision-making process;
- **Increased Accountability** - Once each task is completed, every step (and who conducts them) are instantaneously documented, and available to everyone in the network. Once this is understood, worker truancy levels will become nominal, and, knowing that their work may be scrutinized at any time, quality will increase (and if they under perform, they know that everyone else will know it too);
- **Improved Worker Morale** - By providing workers with all the information they need to perform their tasks (especially job descriptions, tools needed and on-site training), MasterLink enhances employees' predisposition to use their initiative in the performance of their tasks, which empowers them to make decisions that will benefit the enterprise as a whole. By being more productive, workers receive a higher sense of worth;
- **Enlarged Capacities** - By accelerating the time to completion of various tasks, more work can be accomplished by the same equipment, people & systems in the same amount of time. Also, MasterLink enhances maintainability, availability, reliability, and use of facilities through improved maintenance execution. It accelerates and increases work results through better skill management, which further results in better maintained facilities equipment and longer service life;
- **Beyond CMMS** - Though we compete with what CMMS programs are available, MasterLink design and functionality go well beyond CMMS capabilities. It provides an enterprise with a flexible, scalable and practical performance tool that provides a total business performance analysis for management and the workforce;
- **Improved ROI** - MasterLink provides a return on investment in three specific ways: annual savings on the cost of mobile workforce labor and supervision; on data-related costs; and in

quality management (through lower defects). All these above mentioned features and benefits lead to a much stronger ROI than what is currently being offered.

A way that we calculate the savings that can be generated through the installation and implementation of MasterLink, is to consider the costs saved by virtue of the elimination of several personnel from the facilities management process. The U.S. Bureau of Labor Statistics reports that, in a majority of industries, the ratio of supervisors to workers is approximately 1:10, and the average wage/salary for the individuals involved is indicated below. Regarding price, MasterLink delivers a comprehensive work management application well beyond current CMMS technology. Our research indicates that there is room for an aggressive selling program directed toward the middle of our target markets. On the low end, DataStream customers pay between \$5K-\$10K for product (and installation) per module. At the high end, JD Edwards' customers pay between \$500K and \$1.5 million for an enterprise system.

The complete MasterLink system price will range from \$150K to \$750K (of course, a client with thousands of mobile workers would upwards of \$10 million). Component module pricing will range from \$25K to \$75K per module. Implementation revenue, a charge to cover the cost of completing implementation per customer, will average \$250K per new major account (beginning in Yr2). Set-Up Fees are one-time charges to cover the up front costs of the remote device hardware and software (per subscriber). They are assumed paid when a new subscriber is added, at a price of \$1500 for each new unit added.

Pricing will vary slightly due to differences in each market served (primarily due to the availability and/or development of industry facility management standards and the systems required).

We then use this information to determine the cost/benefit of using MasterLink in a typical facilities maintenance operation:

Personnel	Employed Now	Wages & Salaries	Employed w/ MasterLink	Wages & Salaries	Savings
Maintenance Mgrs (\$50K/yr)	1	\$50K	1	\$50K	\$0
Mobile Workers (\$30K/yr)	30	\$900K	24	\$720K	\$180K
Data Clerks (\$20K/yr)	1	\$20K	0	\$0	\$20K
Supervisors (\$40K/yr)	3	\$120K	0	\$0	\$120K
<b>Total</b>	<b>35</b>	<b>\$1.09M</b>	<b>25</b>	<b>\$770K</b>	<b>\$320K</b>
MasterLink Implementation (@ \$2100/pp avg)					\$52.5K
<b>Net Savings</b>					<b>\$267.5K</b>

Table 3. MasterLink ROI: Small Company

As can be seen from the above table, MasterLink can pay for itself in less than six months in a typical facilities management scenario. We anticipate a 20% reduction in the mobile workforce, mainly due to increased efficiency and productivity per worker. Once all a company's P&P are input into the program, there will be no need for data clerks (all new data will be automatically input by those in the program). In addition, there will be no need for supervisors, since management will be able to instantaneously keep track of even the most minute worker function, and the results. Overall, we can anticipate a personnel reduction of 26%, and a savings of over \$300K per 30-worker department. The cost to provide our technology is anticipated to run \$175 per man/month, or \$2100 per employee after installation. In fact, this table indicates

that MasterLink will generate an ROI of 510% in its first year! Assuming this is a company that earns \$9M in income from \$50M in revenues, we just boosted their bottom line by 24.8%  $((250 \text{ mobile workers} + 30) \times \$267.5K) / \$9M$ !

Obviously, a Fortune 500 company, with thousands of employees in this same scenario, would stand to save millions of dollars, and have better maintained facilities as well:

Personnel	Employed Now	Wages & Salaries	Employed w/ MasterLink	Wages & Salaries	Savings
Maintenance Mgrs (\$50K/yr)	333	\$16.7M	200	\$10.0M	\$6.7M
Mobile Workers (\$30K/yr)	10K	\$300.0M	8K	\$240.0M	\$60.0M
Data Clerks (\$20K/yr)	333	\$6.7M	0	\$0.0	\$6.7M
Supervisors (\$40K/yr)	1K	\$40.0M	0	\$0.0	\$40.0M
<b>Total</b>	<b>11.7 K</b>	<b>\$363.4M</b>	<b>8.2 K</b>	<b>\$250.0M</b>	<b>\$113.4M</b>
MasterLink Implementation (@ \$2100/pp avg)					\$17.2M
<b>Net Savings</b>					<b>\$96.2M</b>

Table 4. MasterLink ROI: Fortune 500 Company

Aside from the huge discrepancy in the dollar figures, we also see a 40% decline in the number of management personnel, since all levels will experience increases in productivity and efficiency. This particular scenario results in an ROI of 559% in the first year, which we believe is conservative. They still have a manager/worker ratio of 1:40, when they could do better.

Personnel	Employed Now	Wages & Salaries	Employed w/ MasterLink	Wages & Salaries	Savings
Mobile Workers (\$50K/yr)	100K	\$5B	75K	\$3.75B	\$1.25B
Data Clerks (\$30K/yr)	2K	\$60M	100	\$3M	\$57M
Supervisors (\$70K/yr)	10K	\$700M	6K	\$420M	\$280M
<b>Total</b>	<b>112 K</b>	<b>\$5.76B</b>	<b>81.1 K</b>	<b>\$4.2B</b>	<b>\$1.59B</b>
MasterLink Implementation (@ \$2100/pp avg)					\$170.3M
<b>Net Savings</b>					<b>\$1.42B</b>

Table 5. MasterLink ROI: Electric Power Industry

Each industry, however, has its own cost structures related to workforce management. For example, according to the Electric Power Research Institute, the supervisor ratio in the electric power industry is 1:10. The average supervisor costs (salary + benefits) \$70K, the average technician runs \$50K, and the average data clerk earns \$30K (due to various support functions performed, data clerks won't be entirely eliminated). We can then estimate the value delivery potential for the entire electric power industry, assuming they have 100K mobile workers, with 2K data clerks supporting 10K supervisors (see above

(table).

As can be seen, the incorporation of MasterLink by the entire electric power industry would result in a savings of at least \$1.42 billion in salaries & wages alone, not including productivity and efficiency improvements. By doing such calculations, MasterLink can discover which industries have the highest cost structures to manage.

The bottom line is this: the key drivers of process improvement are time, quality and cost. With MasterLink, the workers are more informed, and thus: know what to do, saving time; know how to do the job right, improving quality; and, are more productive, reducing costs. All in all, we feel comfortable in our assumption that our product will be of keen interest to all organizations that are interested in improving efficiency. Note: the above examples do not reflect improvements in quality management, which will add several points to their bottom line.

#### MASTERLINK: INTELLECTUAL PROPERTY

When the core for the system has been fully coded (programmed) MasterLink will own and control the key element of the software package. While neither of the two primary technology elements employed by MasterLink (Advanced Object-Oriented Technology and Advanced Artificial Intelligence Agents) are proprietary, the framework in which they reside, and the way in which they will react with one another, are. These elements are uniquely combined and employed to provide a decision methodology that automates the work process. This design and open architecture, in addition to the core coding, would be difficult to duplicate (and time-consuming). We believe that this will allow us a window of opportunity, vis-a-vis the competition, of at least one year (if not two). MLC will begin the intellectual property protection process (e.g., patents, trademarks & copyrights) for all design and coding of processes immediately after they are complete. We are budgeting approximately \$15K per year for these efforts.

# MASTERLINK

*Work Automation & Simplification*

MasterLink Corporation

3649 All American Blvd., Orlando, FL 32810-4726

407/299-3900 • Fax 407/299-8200 • E-mail: atek@gdi.net

September 28, 1998

Mr. Dave Kershaw

Program Manager

Technical Research and Development Authority

Investment Initiative for Energy Technologies

6750 South Highway U. S. 1

Titusville, FL 32780

Dear Mr. Kershaw:

It is appropriate that I relate to you in brief at this juncture how MasterLink relates to the conservation of energy. One of MasterLink's primary focuses is to automate the supervision of the mobile workers of the world by using ( artificially intelligent - AI) system agents to automate supervisory functions, which include work planning, scheduling and dispatching. System agents are computer representations of people functions - they behave based on rules - which make them totally configurable in user-customized ways. This gives management the ability to instantaneously respond to changing conditions in planning, scheduling and dispatching of mobile workers in real time so travel time is minimized and worker productivity is maximized with minimal human intervention.

For example use of MasterLink in the telecommunications industry offers considerable energy savings potential and is but one of 20 other domains i.e. utilities and home health care. This industry and others are unique in that it is both large (including both telephone services and cable television companies) and has a significant fraction of its workers in the field, driving to diverse job sites scattered over the company's service territory. Some service territories cover multi-state regions of the U. S.

The light trucks and other vehicles used by the field workers in these industries consume copious quantities of fuel and spew out a variety of air pollutants, including greenhouse gases thought to be contributory to the current global warming trend.

The U. S. Bureau of Labor Statistics reports there are 13.3 million civilian mechanics, installers, and repairers employed. There are 200,000 telecommunication field technical support people and over 28,000 cable television technical support personnel.

In consequence, anything that can be done to reduce times in transit or idling times, and which can reduce unneeded trips, will save energy and reduce exhaust gases and particulates. Use of MasterLink can accomplish this by the improved information flow

to and from the point of work in real time and its ability to nearly instantaneously respond to emergencies and other (scheduling interrupting events) unplanned events. In summation, MasterLink will aid in the planning , scheduling and dispatching of energy-consuming activities, so as to reduce the energy consumed by those activities.

This coupled with creating higher paying technical jobs in Florida is we feel justification for TRDA support of a MasterLink submittal which will enable completion and commercialization of our product.

We are anxious to hear from you and will be happy to submit additional information as is appropriate.

Very truly yours,

  
Kent A. Weisner, C.E.O.  
MasterLink Corporation

# MasterLINK

Meaningful Information for the entire Workforce

MasterLINK Corporation

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Letter sent via facsimile

Mr. David Kershaw

Program Manager

Technical Research and Development Authority

Investment Initiative for Energy Technologies

6750 South Highway U. S. 1

Titusville, Fl. 32780

October 27, 1998

Dear Mr. Kershaw:

Your comments and observations helped us to better feature energy conservation and energy savings in the description of our product.. MasterLink's intelligent work management system assists the organization to use resources, including energy, more efficiently. MasterLink defines work in terms of targets, resources and jobs. Although our focus on resources includes consideration of energy usage we have not been articulating MasterLink's contribution to energy conservation as well as we should have been.

At the moment energy costs in the U. S. are low. Thus energy costs and energy conservation has not had the focus it deserves. Because considerations of energy usage and conservation are built into our product the organization cannot ignore energy conservation. *Our MasterLink software contributes to wise decisions leading to energy saving actions.*

MasterLink software imbeds life cycle costing into the planning and decision making process. For example, more expensive windows that reduce solar heat gain can also reduce the size and cost of the air conditioning system. The result is a lower overall life cycle cost.

Your observations also helped us to better prepare for our meeting with members of the faculty of The University of Central Florida (Department of Engineering) on October 21,1998. They have agreed to subcontract on our proposal to TRDA for funding. In addition, the university has expressed an interest in partnering with MasterLink. UCF views MasterLink as a technical garden of research opportunity. The MasterLink intelligent work management base could become a testbed for multidisciplinary research projects and programs in several departments including: Industrial Engineering and Management Systems , Electrical and Computer Engineering, and Psychology.

We expect that you will be hearing from members of the UCF faculty in the near future.

In the near future, we will be seeking guidance in preparing our MasterLink/UCF proposal to insure we meet all of the requirements for program participation in the TRDA investment initiative. Thank you.

Very truly yours,



Kent A. Weisner, CEO  
MasterLink Corporation

cc: Dr. Martin P. Wanielista, Dean  
The College of Engineering, UCF  
Cc: Dr. M. J. Soileau, Interim Vice President & Dir. CREOL, UCF

Mr. Jack Selter,  
Dir. External Resources  
Office of The Dean, UCF

*sent*

# MASTERLINK

3649 All American Blvd.  
Orlando, Florida 32810-4726

---

DATE: 10-27-98 TIME SENT: 4 P. M.

PLEASE DELIVER THIS FAX TO: Dean Martin P. Weisner & Mr. Jack Seltzer  
COMPANY/LOCATION: College of Engineering UCF

PHONE: 823-6742 FAX: 823-5483

**Message**

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Please see letter page #2.

---

Request Jack fills you in on lots of  
important details I have sent.

---

Thank you,

---

Kent

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TOTAL PAGES INCLUDING COVER PAGE: (2)

FROM: Kent Weisner

PHONE: (407) 299-3900  
FAX: (407) 299-8200  
E-mail: [atek@gdi.net](mailto:atek@gdi.net)

# MasterLINK

Meaningful Information for the entire Workforce  
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3649 All American Blvd., Orlando, FL 32810-4726  
407/299-3900 • Fax 407/299-8200 • E-mail: [atek@gdi.net](mailto:atek@gdi.net)

Letter sent via facsimile

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Program Manager  
Technical Research and Development Authority  
Investment Initiative for Energy Technologies  
6750 South Highway U. S. 1  
Titusville, Fl. 32780

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Kent A. Weisner, CEO  
MasterLink Corporation

cc: Dr. Martin P. Wanielista, Dean  
The College of Engineering, UCF  
Cc: Dr. M. J. Soileau, Interim Vice President & Dir. CREOL, UCF

Mr. Jack Selter,  
Dir. External Resources  
Office of The Dean, UCF

Kent Weisner  
Chief Executive Officer  
MasterLink Corporation  
3649 All American Boulevard  
Orlando, Florida 32810

November 22, 1998

Dear Kent

Congratulations! MasterLink's alliance with University of Central Florida is remarkable. UCF's excellent reputation and expertise will benefit MasterLink tremendously as you apply for the Technical Research Development Authority Investment and for the National Science Foundation grants. Early stage software companies encounter so many barriers due to lack of track record and credibility. The UCF endorsement, along with your strong business plan, goes a long way toward establishing your credibility. It likely will also help you identify investors and more quickly qualify potential customers.

Kent, we both know that a window of opportunity is open now. The legacy vendors know it, too. The first vendor to deliver an intelligent work management system (IWM) will have a distinct advantage. Time is of the essence. As you point out in the business plan, the vendors serving this market now offer traditional, outdated, legacy ERP systems. These legacy systems are expensive, difficult to implement and face unknown problems handling the turn of the century (Y2K.) Your approach, fully utilizing artificial intelligence as a facilitator, positions MasterLink to capture a significant share in what I believe is an enormous target market.

I feel that I have gotten to know you and MasterLink well during the past several months. I am impressed with your approach, your professionalism and your entrepreneurial spirit. I am also impressed by MasterLink's unique design. Your use of proven hardware and software technology and tools will deliver meaningful real-time information to workers and managers. Their scheduling, workflow, productivity and reporting will significantly improve. Their lost-time and over-time will reduce. Their expenses will ultimately drop. As a result, their competitive edge will sharpen and their profits soar.

Your vision for MasterLink, as defined in the business plan, should, in my opinion, result in a highly competitive, industry leading, facilities management application. MasterLink's initial core application will also serve as the architectural nucleus and foundation for future intelligent applications, add-on products and professional services. This developmental approach will provide significant reduction in design, coding and testing times and will facilitate faster delivery of future products and services. Utilizing the strong senior managers and development team members you are bringing on board and following the development and delivery approach described in the business plan, you should deliver a quality facilities management application on a timely basis.

Kent, what I'm saying is: I want in. I would like to participate in the MasterLink's success. I feel Masterlink is well positioned. You provide early investors a unique opportunity. If you are interested, I would like to make a personal financial investment and serve, at least initially, on the advisory board and board of directors. Please let me know if my offer is of interest to you.

Very truly yours,

*Ralph*

Ralph Reichard